CLAIMS

1. A method for estimating the total mass of a motor vehicle, characterized in that the mass (M) of the vehicle is estimated by a recursive least-squares algorithm, which comprises a calculation of the longitudinal acceleration ($\gamma_{estimated}$) of the vehicle on the basis of Newton's Second Law of Motion, by analysis of errors, by means of an acceleration variation ($\delta_{estimated}$ (ΔM, ε,α)) due to errors comprising an error (ΔM) in variation of the vehicle mass relative to a reference mass, an error in the inclination (α) of the surface on which the vehicle is traveling, and errors (ε) of the model, the said inclination (α) being supplied by a slope sensor (23) or by inclination-estimating means.

2. A method according to claim 1, characterized in that it comprises steps during which:

data comprising a reinitialization instruction, the vehicle speed (V), the rate of rotation (ω_{engine}) of the engine, the torque (C_{engine}) transmitted by the engine, detection of actuation of the clutch, detection of actuation of the brakes and detection of cornering of the vehicle are processed in order to calculate the longitudinal acceleration ($\gamma_{estimated}$) of the vehicle, a resultant (F) of the motive forces (F_{engine}), aerodynamic forces (F_{aero}) and rolling forces ($F_{rolling}$), and an equivalent mass (M_j) due to inertial forces of transmission.

3. A method according to claim 2, characterized in that it comprises steps during which:

the said processing of the said data is enabled when they remain respectively in predetermined intervals of values that ensure validity of the model;

the total mass (M_{MCR}) of the vehicle is estimated by a recursive least-squares algorithm;

the estimate of the total mass of the vehicle is supervised by providing a

predetermined mass such that the said algorithm has not converged, by fixing the estimated mass when a predetermined convergence criterion has been reached.

4. A method according to claim 3, characterized in that a loop of the estimated mass is additionally processed, and the said acceleration variation ($\delta_{estimated}$ (ΔM, ε,α)) due to errors comprising an error in the variation (ΔM) of the vehicle mass relative to a reference mass, an error in the inclination (α) of the surface on which the vehicle is traveling, and errors (ε) of the model during data processing is calculated, and an acceleration (γ_{sensor}) that a slope sensor would provide if such were present is estimated and used in the said recursive least-squares algorithm, the said slope-sensor estimate of acceleration (γ_{sensor}) using the said acceleration variation ($\delta_{estimated}$ (ΔM, ε,α)) due to errors.

5. A method according to claim 4, characterized in that the inclination is estimated on the basis of the said acceleration variation ($\delta_{estimated}$ (ΔM, ε,α)) due to errors, and in that the said recursive least-squares algorithm depends on the said inclination (α) and has two modes, a flat mode when the inclination (α) is situated in a predetermined interval of values corresponding to a plane surface, and a slope mode in the other cases.

6. A method according to any one of claims 3 to 5, characterized in that, during data processing, an acceleration (γ_{sensor}) that a slope sensor would provide if such were present is additionally estimated by means of the inclination (α) of the surface on which the vehicle is traveling, the said inclination (α) being provided by the inclination-estimating means and the said slope-sensor acceleration (γ_{sensor}) being used in the said recursive least-squares algorithm.

7. A method according to any one of claims 3 to 6, characterized in that an acceleration (γ_{sensor}) provided by a slope sensor being used in the said recursive least-squares algorithm is additionally processed.

8. A method according to claim 7, characterized in that the inclination (α) of the surface on which the vehicle is traveling is calculated from the said acceleration (γ_{sensor}) provided by the said slope sensor and from the said calculation of longitudinal acceleration ($\gamma_{estimated}$) of the vehicle, and in that the said recursive least-squares algorithm depends on the said inclination (α) and has two modes, a flat mode when the inclination (α) is situated in a predetermined interval of values corresponding to a plane surface, and a slope mode in the other cases.

9. A device for estimating the total mass of a motor vehicle, comprising wheel-speed sensors, an engine-torque sensor, a rate of rotation of the engine sensor, a clutch-pedal position sensor, a brake-pedal position sensor, means for detecting cornering of the vehicle, and an electronic control unit to which the said sensors are connected, characterized in that the electronic control unit contains:

a reinitialization means;

means (4) for estimating the total mass (M_{MCR}) of the vehicle by a recursive least-squares algorithm, comprising a calculation of the longitudinal acceleration ($\gamma_{estimated}$) of the vehicle on the basis of Newton's Second Law of Motion, by analysis of errors, by means of an acceleration variation ($\delta_{estimated}$ (ΔM, ε, α)) due to errors comprising an error in variation (ΔM) of the mass of the vehicle relative to a reference mass, an error in the inclination (α) of the surface on which the vehicle is traveling, and errors (ε) of the model;

means (2) for processing of data transmitted by the said sensors;

means (3) for enabling the said processing of the said data when they remain respectively in predetermined intervals of values that ensure validity of the model; and

supervising means (5) for providing a default mass as long as the said algorithm has not converged, by fixing the estimated mass when a predetermined convergence criterion has been reached.

10. A device according to claim 9, characterized in that it additionally contains a slope sensor capable of transmitting a longitudinal acceleration (γ_{sensor}) of the vehicle to the processing means.